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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,488	11/26/2003	Robert A. Sutton	1897A1	9540

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PPG INDUSTRIES, INC.
Intellectual Property Department
One PPG Place
Pittsburgh, PA 15272

EXAMINER

ASINOVSKY, OLGA

ART UNIT	PAPER NUMBER
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1711

DATE MAILED: 09/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/723,488	Applicant(s) SUTTON ET AL.	
	Examiner Michael Bernshteyn	Art Unit 1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-124 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-124 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>06/10/2005</u> | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities. The summary of the invention includes unnecessary details.

Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-121 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-48 of U.S. Patent No. 6,677,422 in view of Dankworth et al. (U.S. Patent 5,650,536) and E. Bruce Nauman ("Chemical Reactor Design, Optimization, and Scaleup", McGraw-Hill, 2002).
3. Although the conflicting claims are not identical, they are not patentably distinct from each other because claim 1 of U.S. Patent 6,677,422 recites method of making alternative copolymers substantially identical to that instantly claimed, the only

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difference is that Applicant generally claims the using of pressurized stirred tank reactor (STR) for making a copolymer composition with feeding one or more monomer compositions and initiator compositions to an STR, maintaining them in the STR for residence time sufficient to effect conversion of the monomers to a copolymer composition, the maintaining the liquid level in the STR such that there is no air or vapor space in the STR, and discharging the copolymer composition by way of the outlet.

Dankworth discloses a continuous process for functionalizing olefins, especially polymer olefins in a continuous stirred tank reactor (CSTR) or pipe reactor. He discloses that the liquid-filled pipe reactor operates in plug flow with static mixer and the CSTR is operated **in the substantial absence of air at constant liquid level** (abstract and claim 4). In the CSTR type reactor configuration, liquid and vapor phase reactant are fed to the single stage reactor equipped with mechanical agitator to promote liquid/gas contact and provide uniform concentration throughout the reactor. The CSTR configuration of the invention may use more than one reactor (col. 13, lines 66-67 and col. 14, lines 1-4) and static mixers provide **residence time for reaction** (col. 14, lines 32-35). The reactants are fed to the process by pump or compressors and mixed together just before or just after entering the reactor or CSTR (col.13, lines 56-58). He discloses that the continuous process is especially advantageous with viscous polymer olefins (col. 9, lines 66-67).

Nauman discloses the perfectly mixed, continuous-flow stirred tank reactor (CSTR) as a kind of **ideal reactors** (page 10), which, like other ideal reactors, has a lot of adventures. Reactants are charged to the system, rapidly mixed, and rapidly brought

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up to the temperature so that reaction conditions are well defined. Heating is carried out with an oil bath or an electric heating mantle. Mixing is carried out with a magnetic stirrer or a small mechanical agitator. Temperature is controlled by regulating the bath temperature or by allowing a solvent to reflux.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to include the STR with feeding monomer compositions and an initiator composition to it and maintaining these compositions for a residence time sufficient to effect conversion of the monomers to a polymer composition, as taught by Dankworth in US'536 in order to charge, mix and bring the reactants to temperature at the beginning of the reaction cycle, and the mixing and heat transfer are sufficient to assure that CSTR remains completely uniform throughout the reaction cycle as taught by Nauman (page 11), and thus to arrive at the subject matter of claim 1 of Application No. 10/723,488. The limitations of dependent claims of US 6,677,422 are identical to the limitations of dependent claims of Application.

Therefore, the instant claims are obvious variants of claims of US 6,677,422, and one skilled in the art would not be able to practice the invention of the instant claims without infringing the invention of US 6,677,422.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-22, 24-65, 67-103, 105-121 are rejected under 35 U.S.C. 103(a) as obvious over Coca et al. (U.S. Patent 6,677,422) in view of Dankworth et al. (U.S. Patent 5,650,536) and Nauman ("Chemical Reactor Design, Optimization, and Scaleup", McGraw-Hill, 2002).

Coca discloses a method of making a copolymer composition containing a copolymer, which includes the steps of (a) providing a donor monomer composition that includes an isobutylene type monomer; (b) mixing the donor monomer composition with

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an ethylenically unsaturated monomer composition that includes one or more ethylenically unsaturated acceptor monomers, and is substantially free of maleate type monomers and fumarate type monomers, and (c) polymerizing the mixture resulting from step (b) in the presence of a free radical polymerization initiator. The polymerization is carried out in the substantial absence of Lewis acid and/or transition metals (abstract). Coca discloses a donor monomer composition that includes an isobutylene type monomer (formula I), ethylenically unsaturated acceptor monomer (formula III), ethylenically unsaturated monomers (formula IV) in claims 1, 6 and 19.

Coca discloses all substitute groups in formulas I, III and IV (col. 35, lines 3-14, col.35, lines 48-67 and col. 37, lines 1-17), the functional groups incorporated into the copolymer (col. 36, lines 11-16), the initiator (col. 36, lines 17-23), the azo compound (col. 36, lines 31-43), the ethylenically unsaturated acceptor monomer (col. 36, lines 44-51), the sequence of steps in the method of claim 1 (col. 36, lines 53-67), etc. Furthermore, by the virtue of copolymerization of two monomers with different activity towards each other, as in Coca, the alternating copolymers of isobutylene type monomers are inherently formed.

Coca discloses the instantly claimed STR for making such copolymers (examples 1-A through 8-EE, col. 13, line 18 through col. 30 line 34) with using of **stirred** stainless steel **pressure reactor**, which was then **pressured** with nitrogen providing a 5 psig pad on the reactors, mixed and polymerized of charges 1-3 (col. 13, lines 35-38, col. 14, lines 13-15, col. 14, lines 50-53, col. 15, lines 21-23, etc.). The ethylenically unsaturated monomers composition and the free radical polymerization initiator are separately and

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simultaneously added to and mixed with the donor monomer composition (col.9, lines 12-15), the unreacted portion of the monomer of structure (I) is substantially removed from the resulting copolymer composition by evaporation (col. 9, lines 66-67 and col. 10, lines 1-2). Coca discloses that after polymerization any unreacted monomer of structure (I) is substantially removed from the resulting copolymer composition by evaporation (col. 36, lines 57-60).

As for instant claim 1, Coca does not disclose maintaining one or more monomer compositions and initiator compositions in the STR for residence time sufficient to effect conversion of the monomers to a copolymer composition, and the maintaining the liquid level in the STR such that there is no air or vapor space in the STR.

As for claim 1(d), Dankworth discloses a continuous process for functionalizing polymer olefins in a continuous stirred tank reactor (CSTR) or pipe reactor. He discloses that CSTR is operated **in the substantial absence of air at constant liquid level** (abstract, line 5-7).

As for claim 1(e), Dankworth discloses that in the CSTR type reactor configuration, liquid and vapor phase reactant are fed to the single stage reactor equipped with mechanical agitator to promote liquid/gas contact and provide uniform concentration throughout the reactor. The CSTR configuration of the invention may use more than one reactor (col. 13, lines 66-67 and col. 14, lines 1-4) and static mixers provide **residence time for reaction** (col. 14, lines 32-35, col. 21, lines 54-57). The reactants are fed to the process by pump or compressors and mixed together just before or just after entering the reactor or CSTR (col.13, lines 56-58).

As for claim 1(f), Dankworth discloses that the reactor contents can then be discharged (col. 13, lines 48-49).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to operate the STR in Coca's working examples in the substantial absence of air at constant liquid level and maintain the monomers and initiator compositions in the STR for a residence time sufficient to effect the conversion of the monomer to a copolymer because it has been working successfully in Dankworth's CSTR process and an ordinary skilled in the art would have expected such embodiments also work successfully into Coca's polymerization process, and without a number of drawbacks when used commercially comparing with copolymer compositions that contain Lewis acid and/or transition metals intermingled with the copolymer (US' 536, col. 3 lines 14-17).

Coca discloses the limitations of dependent claims 2-48 of US 6,677,422 (col. 35, lines 30 through col. 40, line 60) which are identical to the limitations of dependent claims of Application (claims 2-16, 39-40, 43-58, 83-99, 120-121).

Dankworth discloses the limitations of dependent claims of Application (claims 17-22, 24, 26-30, 33-34, 36-38, 59-63, 65, 67-70, 73-74, 76-80, 100-105, 107-111, 114-119).

With regard to the limitation of the instant claims 25, 66 and 106, wherein the pressure in the STR is from 300 to 1,000 psig, Dankworth discloses that useful pressure can be up to 20,000 psig, and typically will be at least 300 psig, and most preferable at least 1000 psig (col. 13, lines 30-33).

With regard to the limitation of the instant claim 35, 75 and 116, wherein after discharging the copolymer composition in (f), the copolymer composition is fed to a wipe film evaporator, Dankworth discloses that the product is moved by pump preferably through a wiped film evaporator (col. 16, lines 27-28). Also, wiped film evaporators and methods for their use are known in the art and described, for example, in U.S. Patterns 3,687,983, 3,695,327, 4,054,485, US 20040211657 (filing date 04/11/2003), etc.

With regard to the limitation of the instant claim 42, the rationale for the rejection of claim 1 is incorporated herein by reference.

With regard to the limitation of the instant claim 41, 81 and 82, wherein the monomers and initiators are introduced to the STR at essentially the same rate as the copolymer is withdrawn from STR and any unreacted monomers of structure (I) are removed from the copolymer and used as part of at least one of monomer compositions in (b), Dankworth discloses that the reactor contents can then be discharged (col. 13, lines 48-49). Nauman discloses that recycling of partially reacted feed streams is usually carried out after the product is separated and recovered. Unreacted feedstock can be separated and recycled to (ultimate) extinction. It is a loop reactor where some of the reaction mass is returned to the inlet without separation. Internal recycle exists in every stirred tank reactor. An external recycle loop... is less common, but is used, particularly in large plants where a conventional stirred tank would have heat transfer limitations (page 139).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the same rate for incoming and outgoing components to

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prevent the accumulation of the products in STR from one side and to increase the efficiency of the method from another side.

With regard to the limitation of the instant claims 31, 32, 71, 72, 112 and 113, Dankworth discloses that the CSTR configuration of the invention may use more than one reactor ...although a single stage is simpler and less expensive. Multiple stages may be used to reduce total volume and residence time (col. 14, lines 3-6).

5. Claims 23, 64 and 104 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coca and Dankworth as applied to claims 1-22, 24-65, 67-103, 105-121 are above, and further in view of Jarvis et al. (U.S. Patent 4,728,701).

Regarding the limitation of the instant claims 23, 64 and 104, wherein a back pressure control valve is positioned on the outlet, Jarvis discloses a process for the polymerization of acrylates, which is preferable conducted in CSTR under sufficient agitation to provide a homogeneous reacting mass (col. 2, lines 36-40). The transfer line 39 (Figure) is provided with a back pressure control valve 72, which is responsible to the discharge pressure of polymer gear pump 25 (col. 6, lines 29-34).

Therefore, It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a back pressure control valve taught by Jarvis into Coca's process in order to obtain the aforementioned advantages in the absence of showing any criticality of the record.

6. Therefore, it is the examiner position to believe that method characterized by exactly the same polymerized monomers of formulas I, III and IV and exactly the same sequence of processing steps in US'422 (col. 3, line 28 through col. 30, line 12) would

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be identical to the instant claimed method of making copolymers containing olefinic type monomers. Furthermore, by the virtue of copolymerization of two monomers with different activity towards each other, as taught by Coca and Dankworth, the alternating copolymers of olefinic type monomers are inherently formed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(e) that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 122-124 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Coca et al (U.S. Patent 6,677,422)

Regarding the copolymer's limitations in view of substantially identical monomers, initiators and process producing such products being used by both Coca and the applicant, it is the examiner position that the instantly claimed copolymers are not necessarily different from Coca's copolymers.

Since the USPTO does not have proper equipment to do the analytical test, the burden is now shifted to the applicant to prove otherwise. *In re Fitzgerald*, 619 F.2d 67,70, 205 USPQ 594, 596 (CCPA 1980).

Conclusion

Other references used but not cited in this office include U.S. Patents 4,045,507, 4,045,508, 5,191,145, 5,274,153, 6,906,164, 6,649,670, 6,525,149, 6,881,800, 5,693,870, 4,619,979) are shown on the Notice of References Cited Form (PTO-892).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Bernshteyn whose telephone number is 571-272-2411. The examiner can normally be reached on M-F 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Bernshteyn
Patent Examiner
Art Unit 1713

MB
08/18/2005



DAVID W. WU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER

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